# KAZAKSTAN INVESTMENT FUND CONSIDERATIONS

**Theodore Reynolds Smith**

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Ted Smith is Chief Economist and Managing Director of Corporate Development at Dames and Moore, a short-term consultant with the NIS-EEP Project, and a former HIID Senior Environmental Finance Advisor in Slovakia.

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For additional information please contact: International Environment Program, Harvard Institute for International Development, One Eliot Street, Cambridge, MA 02138.
Tel: (617) 496-5176. Fax: (617) 496-8040.

## 1. INTRODUCTION

Kazakstan is at a unique point in its history. As a newly independent nation it has both the freedom and financial resources to chart a new course for its people. There are several options available for the encouragement of economic growth and development. One instrument that may serve the country well is the establishment of an independent investment fund. A successful fund could provide the foundation for domestic economic growth as well as aiding in the development of Kazakstan as a financial center for the region. This paper is designed to address some of the issues involved in the establishment of such a fund.

## 2. GENERAL ECONOMIC IMPLICATIONS

**The Domestic Economy's Absorptive Capacity.** While Kazakstan has undergone a serious readjustment since 1991 when, with independence, the market for its heavy manufactured goods was greatly diminished, the country possesses a highly literate and skilled labor force, capable of working in a broad range of industries. It is imperative, however, that infrastructure be improved and that institutional conditions be oriented toward accommodating private investment. One of the key elements in facilitating the industrial sector's transition is to maintain wages at a level that assures they are competitive with international workers undertaking similar activities. This suggests that wages in the fossil fuel sector need to reflect the general wage level throughout the economy. Moreover, workers need to understand that the amount they are paid must be directly related to the value of the product they produce. If wages in the fossil fuel sector are allowed to outstrip productivity in other sectors of the economy, unemployment in the industrial sector will increase. As fossil fuel-based workers spend their income, inflation will ensue, resulting in the erosion of real income for government employees, teachers, and members of the military, thus increasing the likelihood of political instability.

**Overseas Investments.** While certain improvements in infrastructure will have to be made to set the stage for direct foreign investment, maintaining a significant portion of the revenues from non-renewable fossil fuel development in overseas investments will assist in sheltering the economy from inflationary pressures. Maintaining a significant portfolio of external financial reserves will strengthen the Kazakstan foreign exchange rate. A stable exchange rate, controlled inflation, and reasonable wage rates will provide an incentive to potential foreign investment.

**Exchange Rates.** Exchange rates react to several factors, largely domestic inflation, interest rate differentials, and trade deficits. Given the potential for fossil fuel exports to exceed imports, the other two factors are within the control of the Kazakstan government. A well-managed investment fund will assist in moderating exchange rate fluctuations.

**The Banking System.** A stable foreign currency and sizeable foreign reserves will strengthen the country's monetary system. If inflation can also be kept under control, an investment fund can assist in keeping interest rates at low levels, thus improving the marginal efficiency of capital. The investment fund should manage its resources so that its cash management function involves funds deposited through the local banking system. These deposits can further reduce pressure on interest rates and lower the cost of capital to local businesses and potential investors.

**Direct Foreign Investment.** A critical element in achieving sustained economic growth is the attraction of direct foreign investment. Allowing market forces to direct investment will result in the most efficient allocation of Kazakstan's resources. The monetary stability that can be generated through the establishment of an investment fund will play a major role in attracting foreign investment.

**Domestic Investment.** Sound monetary policies and a stable banking system will tend to keep interest rates low. If the investment fund's cash management activities are able to supply liquidity to the banking

system, funds will become available for local businesses to participate in investment opportunities. Local investors should take advantage of these sources of funds and participate in joint ventures with foreign investors who are willing to provide opportunities for technological transfer.

**Long-Term Stability.** A soundly managed investment fund can serve as a source of long-term monetary stability. The building of foreign reserves will continue to provide a foundation on which local investment can be leveraged, both from domestic and foreign sources. Eventually, as fossil fuel production declines, revenue from the investment fund can supplement this resource-based source of income.

## 3. FUND OBJECTIVES

**Non-Renewable Resources.** Although the development of fossil fuels is likely to provide significant revenues for the people of Kazakhstan, eventually production will decline. If Kazakstan fails to provide for alternative sources of revenue during the most productive years, the country may suffer a serious economic decline without alternative sources of revenue in the future. One must also recognize that the sale of fossil fuels from Kazakstan is dependent on trans-shipment by pipeline through foreign countries. Given the distance the pipeline must travel, and the potential for disruption in its flows, it is only prudent for Kazakstan to establish an investment fund to deal with these eventualities.

**Accumulation and Preservation of Capital.** Regardless whether the entity is an individual or the government of a country, capital resources are difficult to accumulate. An established program of allocating a percentage of cash flow to a capital appreciation fund is a sound approach to building capital funds. Setting the money aside in a reserved investment fund is an assured means of preserving the money that has been saved.

**Capital Growth.** A prudent investment strategy will provide not only for periodic additions to the capital fund; interest and profits from investments will accumulate and add to the total amount of the investment fund. At present interest rates, an amount of capital invested today will double in size in approximately eight years, without any further capital investments.

**Diversification.** A well planned, structured, and managed investment fund will anticipate a wide range of risks. By placing capital funds in a variety of investments throughout the world, problems in one segment of the portfolio will be counter-balanced by investments elsewhere. Risk in one part of the world, where returns are great, can be offset by investments where the risk might be less, but returns are less.

**Development of Staff Capabilities.** Oil and gas production and export represent a relatively small number of jobs per unit of export. While Kazakstan will be the beneficiary of a large flow of funds throughout a significant period of time, there will be a need to create employment opportunities for the country's people. The opportunity exists for Kazakstan to develop alternative sources of revenue and for non-fossil fuel employment in the financial sector. This is important for two reasons. First, it is preferable for the country's own citizens to understand how their money is being invested and managed. Second, there are a number of different types of financial sector jobs that can provide lasting careers for local citizens.

**Technological Transfer.** Kazakstan's future also depends on its ability to compete in financial markets throughout the world. In order to achieve this goal, it will be necessary for local citizens to learn the latest techniques of financial management. This can be achieved most effectively if those investment fund managers who are hired to assist in the fund's operations are committed to training and transferring the latest technologies to their Kazakstani counterparts.

**On-the-Job Training.** The transfer of technology can best be achieved through on-the-job training. Each consultant and investment advisor should be committed to working with local employees and assisting them in learning how to perform every appropriate function. This means that, at times, local employees may be involved in operations that will lose money. They should be evaluated fairly and be taught to learn from their mistakes so they can grow in their jobs.

**Leveraging Financial Influence.** The establishment of a large investment fund will open investment opportunities throughout the world. Some attractive potential investments only become available on a large scale; a well-structured investment fund might be able to take advantage of these opportunities. In other situations, political favor can be earned by making investments in projects that are viewed favorably by the host government. The investment fund can be used to enhance Kazakhstan's reputation and influence throughout the world.

**Controlling Financial Resources.** A large investment fund can participate in structuring major transactions, and while the Kazakstan fund might only be a limited portion of the overall investment, the fund's managers may be able to dictate terms and conditions that are favorable to the country.

## 4. INVESTMENT CONSIDERATIONS

**Investment.** An investment can be defined as the current commitment of funds for a period of time in order to obtain a future flow of funds that will compensate the investing unit (1) for the time the funds are committed, (2) for the expected rate of inflation, and (3) also for the uncertainty involved in the future flow of funds. The purpose of investing is to defer current consumption and thereby add to wealth so that it will be possible to consume more in the future.

**Risk and Uncertainty.** Risk is generally associated with an unknown future return on investment. Often the longer the required period of investment, the greater the uncertainty associated with receiving an expected return on the investment. Risk free investments are limited in scope. In recent times United States Treasury bonds have been viewed as the benchmark against which other investments are measured. Ignoring the risk associated with currency fluctuations for the moment, some might consider similar investments in long-term German, Japanese and British bonds to be comparable.

Other forms of risk might be identified as *business risk*, where the cash flow from a business activity might be affected by economic conditions; *exchange rate risk*, where money must be transferred from one currency to another; *financial risk*, where interest rates might influence the ability for a project to support itself from cash flow; and liquidity risk where the lack of a market for the investment might limit access in a reasonable period of time. The larger the risk of having access to both the return *of the investment* and the return *on the investment* the greater the return an investor will expect to receive.

**Liquidity.** Emergencies can arise at any time; the ability to have immediate access to financial resources enables the investor to react quickly in the event of an emergency. The ability to buy or sell an investment quickly without a substantial price concession is known as liquidity. Since most investors would prefer to have this flexibility, the premium received for depositing funds with immediate access is very low. While cash is commonly thought of as a highly liquid asset, other assets can be viewed similarly. For example, a widely traded Treasury bond denominated in one of the major financial currencies is considered to be a liquid asset. An illiquid asset would be a specialized building or land in a remote location, where few purchasers can be found and a long period might pass before a sale could be consummated.

**Security.** Investments are most secure when they are covered by laws that protect both the investor and the investment. One of the reasons the United States has become an attractive target for investments from

throughout the world is that the legal system guarantees fair treatment, with minimum involvement from the government. In addition, secure investments are associated with a minimum degree of risk from the sources outlined above. In some societies certain types of investments that are identified with tangible assets, such as gold or real estate, are viewed as being more secure than intangible assets such as share certificates. There is a close relationship between institutional laws and an investor's willingness to accept intangible versus tangible assets when making an investment.

**Interest Rates.** Interest rates are a premium received for foregoing access to capital today in exchange for its return at some future date. The magnitude of the interest rate is dependent on the prevailing rate of inflation, the length of time the investment is committed for, and the uncertainty associated with the return of the investment. The level of interest rates reflects how people view the future prospects for inflation, employment, economic growth, and political stability.

Many economic decisions are founded on information related to interest rates. Interest rates serve a variety of purposes. As a general rule they provide a mechanism whereby scarce funds can be rationed among potential users. In these circumstances interest rates serve as the price of available funds. Interest rates also serve as a means of relating expectations of future actions with present activities. Decisions related to interest rates are made by individuals, companies, and governments. For those requiring the use of someone else's money, interest rates are viewed as a cost of borrowing. On the other side of the relationship, those charging interest for the use of their money consider it as income.

**Capital Growth and Compound Interest.** If a person is offered a choice between receiving $100 today or waiting 5 years to receive the $100, a rational person would normally select the $100 today. The basis for this decision is that the individual could place the $100 that is received today in a savings account and receive 12 percent interest annually over the 5-year period. In 5 years the initial deposit would accumulate interest, which would be compounded, allowing the initial deposit to grow to $176.22 by the end of the 5th year. This concept is developed more fully in the Appendix.

**Target Rates of Return.** Investment objectives will change over time. Investment fund managers will set targets for specific types of investments; generally these targets will be compared with benchmarks derived from published documents outlining how different markets have performed. It is important for the investment agency to establish targets and to monitor performance against published international standards.

**Bond Markets and Their Characteristics**. Bonds are issued when a government or a private company borrows money and promises to repay the full amount at the end of some specific period of time. Over the life of the bond, periodic interest payments are made to the bondholders. It is because of this feature that bonds are frequently referred to as fixed-income investments. Generally bonds with a shorter life return a lower interest rate than long-term bonds. Interest rates will vary depending on the degree of risk and security associated with the issuing government or company.

Government bonds tend to be more secure than private corporate bonds, although this varies greatly from country to country. In the case of a government agency, bonds may be classified as general obligation bonds, where the government's tax revenue is pledged toward redemption, or revenue bonds, which are limited to revenue generated from a specific project.

Corporate bonds also have different forms, ranging from straight long-term debt obligations to convertible bonds that can be exchanged for a company's stock under certain circumstances. Because bonds are generally issued at a fixed interest rate, the capital value of the bond will change if the bond is sold prior to maturity and if there has been a change in interest rates. In some instances bonds are issued without a

commitment to pay periodic interest; the interest is paid at the end of the term. In this case the bonds are known as zero-coupon.

**Equity Investments.** Common stocks, or equities, are a popular means of participating in the ownership of a private company. Owners of common stock are able to participate in the success and failure of individual companies. Stocks are generally sold on public exchanges, and the price of the stocks will vary depending on the company's earnings and dividend performance, the market atmosphere, and general economic conditions. Equity ownership allows investors to participate in ownership of a company and at the same time limit their exposure to liability incurred by the company. If the company fails and goes bankrupt, the stockholders are the last to receive any revenue for the liquidation of the company's assets.

## 5. FUND MANAGEMENT

**Ethics.** It is imperative that those who are employed by the Kazakstan investment fund be selected for their honesty and dedication to the creation of a strong Kazakstan. Eventually the nation's future will depend on its financial resources. Those who work for the fund should be willing to accept responsibility for guiding the country into the next century.

**Structuring an Investment Fund.** One of the principal objectives of an investment fund is to manage risk within the limits established by the fund's board of directors. One means of accomplishing this objective is to establish a system of *checks and balances*. This involves (1) establishment of an honest team of local officials to oversee the fund's operations; (2) selecting a team of professional investment managers; and (3) selection of a reputable independent auditor.

**International Diversification.** Not all financial markets are going to move in unison. Therefore any well-managed fund will have to develop a strategy which compensates for losses in one or more markets. Fund managers attempt to protect against two market timing losses: (1) adverse movement in exchange rates; and (2) specific market corrections. This is accomplished through investing funds in several different markets simultaneously, a strategy known as portfolio diversification.

Designing a portfolio's basket of currencies is one of the first, and most important, decisions that any fund's management committee must make. The most prevalent currencies used to manage portfolios are the United States dollar, the Japanese yen, the British pound, and the German duetchmark; although some fund managers also favor the Swiss franc. Declines in the value of the United States dollar will generally be offset by changes in the Japanese yen and the other currencies. Research has shown that a diversified portfolio tends to out-perform fixed currency portfolios over the medium to long term.

**Selecting Fund Managers.** It is imperative that experienced professional management be selected to assist in maintaining the Kazakstan investment fund portfolio. Assistance in managing portfolios is available from private firms commonly associated with commercial or investment banks. A range of options is available when selecting private fund managers. While a single fund manager might be capable of providing a full range of services, representing a diversified basket of currencies, a strong argument can be made for diversifying risk by working through several fund managers. A strategy founded on using several fund managers is supported by recent experiences with two premier companies which have encountered difficulties: Barings, the well-established British firm, failed due to the excessive foreign exchange trading of one of its employees, and Nomura Securities, a highly regarded Japanese institution, has experienced a series of scandals.

The directors of the Kazakstan investment fund should determine those currencies appropriate for diversification of its portfolio, and then solicit proposals from several companies that meet predetermined

Government qualifications. Selecting fund managers will not be a easy task. Prospective candidates will use every means available to convince the Kazakstan decision makers that they are the best qualified fund managers for the Government's *entire* portfolio. They will do their utmost to discredit their competitors and gain control of the investment fund's resources. It would be advisable during this process to consult with one or more outside financial advisors who are independent and have nothing to gain from the selection of the Kazakstan investment management team.

Among the factors the Government will want to consider are the following:

1. Strength of the firm's balance sheet;
2. Experience in managing foreign country assets;
3. Demonstrated performance over a sustained period of time;
4. Internal company controls;
5. Reporting and communication procedures;
6. Relationships with Kazakstan financial institutions;
7. Capacity for training Kazakstan nationals; and
8. Fees charged for the full range of services.

Management fees are extremely important and will vary greatly, generally depending on the total value of the assets under management. A fund with the potential asset value of Kazakstan's should support fees at the lower end of the range. For example, a large fund might experience management fees in the range of 0.01 percent to 0.02 percent. However, smaller amounts, such as US$10 million, may face fees of about 1 percent of the average value of the portfolio.

The danger in establishing a formal investment unit that is based on small capital amounts is that the operation and control of the fund may be uneconomical. So if the value of the fund is relatively small at the outset, a different strategy may be called for than if the fund's value is relatively large. If the fund is relatively small at the beginning, fewer fund managers may be preferable and only a limited number of local staff might be assigned to work with the fund managers and receive training. Three or four local economists and accountants from the Government would work closely with the investment managers for daily monitoring. These Government representatives should represent an independent unit assigned the responsibility for overseeing the investment managers and reporting to the Government authority responsible for the integrity of the investment fund. This unit must be separate from such departments as the Ministry of Finance or the Treasury Budget Division.

The Kazakstan investment fund needs to maintain its autonomy and not be under continual pressure to support "pet" projects being promoted by those with political influence.

**Portfolio Asset Allocation.** Each fund manager will have different opinions regarding the composition of the Kazakstan investment fund's assets. Eventually, however, the decision on how to allocate the nation's financial resources should be made by the board of directors for the Kazakstan investment fund. This would be done with full input from the fund managers and additional support from specialists who are well-versed in international economics and the objectives of the Kazakstan people. Options available to the investment fund's board of directors would include several different forms of investment assets. Those assets include the following:

1. Cash Management. At any point in time the fund would maintain 5-10 percent of its assets in cash, with movement toward the higher percentage when risks and uncertainties increase for other forms of investments.
2. Bonds. Bonds are at the heart of the investment portfolio. It should be remembered that even though AAA-rated bonds are among the most conservative forms of investment, they might

experience a loss in capital value due to interest rate fluctuations. Bonds would probably represent 25-35 percent of the portfolio.

3. Stocks and Equities. Stocks are considered the best means of protecting against inflation and growing the investment fund's capital value during periods of economic expansion; they would probably represent 35-45 percent of the investment fund's assets.
3. Direct Investments. Although closely tied to stocks and equities, there may be circumstances where the investment fund might elect to purchase a technology or company in full. In these circumstances, shares may not be traded on a stock exchange. The percentage of assets in this category would probably fall within the same classification as stocks and equities.
5. Real Estate and Gold. Investment in real estate is viewed by some as a secure, long-term growth strategy and such investments would probably represent 15-25 percent of the investment fund's assets. Many funds also maintain 1-3 percent of their assets in gold.
6. Currencies, Futures Trading, and Derivatives. Throughout the investment process, currencies will be traded continually. In order to protect against exchange rate losses, fund managers often hedge against market risk by investing in futures contracts. In certain circumstances risks may also be packaged in what have come to be called derivative instruments. It is vital to exhibit extreme care when trading in any form of futures contracts since they represent the most risky segment of financial markets. Such activities must be well supervised and transactions should be handled by experienced representatives.

**Internal Controls.** Regardless of the extent to which external fund managers are involved in the investment portfolio's day-to-day operations, extreme caution will have to be taken to protect against isolated instances where individuals may be tempted to exploit positions of responsibility and divert funds to illegal or non-intended uses. Moreover, in some situations local staff may experience significant losses during the operations of their trading duties. It is not uncommon for even the most experienced investment trader to try to cover up losses in hopes that future gains will offset previous incorrect investment decisions. This is exactly how one of Baring's most experienced traders caused the collapse of one of England's oldest investment companies.

At a very early stage it is therefore imperative that internal controls be established to protect against individuals exceeding their authority or diverting funds from intended uses. Without these controls there is little value in establishing an independent investment fund.

**Evaluating Performance.** The performance of investment fund managers will fluctuate greatly over time. Even the best of managers experiences losses. Care should be taken to see that each investment fund manager is evaluated fairly. Continual monitoring will also enable the Kazakstan investment fund board of directors to identify emerging problems, which might require corrective action by fund managers, or in extreme circumstances by the board of directors.

Independent comparisons are available and should be used by the investment fund's external auditors or a team from within the fund. Reputable and established indices might include published results from Standard & Poors, Moody's Investment Services, the World Equity/Bond Index, or other comparable sources.

**The Auditing of Accounts.** In addition to internal controls and audits and the auditing by individual fund managers, it is important for the Kazakstan investment fund to contract with a well-respected and established firm of accountants. This is a task that must be undertaken early in the process, so that they may assist in the establishment of the fund's internal controls. As in the case of investment fund managers, the competition for receiving this work will be extreme.

Care must be taken to see that only the best team of auditors is selected. It is not uncommon for an auditing firm to promise the best product, quote a low price, and then assign inexperienced and lower-cost junior staff to the actual auditing of accounts. Assurances must be secured as to the level of experience of each participant in the process, and there must be a clear understanding of the exact lines of responsibility and the individual responsible for the final audit.

**Information Management.** The development of computers has made monitoring and management of financial information more efficient and cost effective. An integral component of establishing the Kazakstan investment fund should be an information system that enables the fund's local staff and the board of directors to have clear and concise reports on their portfolio's performance on a timely basis. This system should be under the direct control and supervision of the Kazakstan investment officials. Its development and implementation should be pursued at the earliest possible date.

## APPENDIX

**Compound Interest.** The process by which compound interest occurs is demonstrated as follows:

YEAR 1: $100+100(i)=100+100(.12)=100+12=112$

which is the same as: $100(1+i)=100(1+.12)=100(1.12)=112$

YEAR 2: $100(1.12)(1.12)=125.44$
$100(1.12)^2=125.44$

YEAR 3: $100(1.12)^{2(}1.12)=140.49$
$100(1.12)^3=140.49$

YEAR 4: $100(1.12)^3(1.12)=157.35$
$100(1.12)^4=157.35$

YEAR 5: $100(1.12)^4(1.12)=176.22$
$100(1.12)^5=176.22$

**TABLE 1. Growth of $100 at 12% Interest**

| START OF YEAR | INTEREST EARNED | YEAR-END TOTAL |
|---|---|---|
| $100 | $12 | $112 |
| $112 | $13.44 | $125.44 |
| $125.44 | $15.05 | $140.49 |
| $140.49 | $16.86 | $157.35 |
| $157.35 | $18.88 | $176.22 |

The previous example has demonstrated that, if the prevailing interest rate on bank deposits is 12%, the receipt of $100 at the start of year 1 would be equivalent to receiving $125.44 at the end of year 2, or $157.35 at the end of year 4. In each of these instances an individual has the ability to place an initial payment into a secure bank account and earn 12% interest each year, with the interest earned in succeeding years being based on the accumulation of the initial principle plus interest earned in the previous years.

It can be seen that the term which includes the interest rate (1+i) is squared in the second year, raised to the power of 3 in the third year; or in general terms, it is raised to the power of the year in which the deposit is going to be received. The term can therefore be expressed as follows:

$$\mathbf{(1+i)^n}$$

The next question is, how much would someone pay today, in order to receive a payment of $112 at the start of year 2? We know that the prevailing interest rate is 12%. The following relationship has been taken from the first example:

$$\$112=100(1+i)=\$100(1.12)$$

Solving for the answer we get:

$$\$112 \div (1.12) = \$100$$

If we ask the same question regarding a payment of $157.35 at the end of the fourth year, we get the following results:

$$\$157.35 \div (1.12)^4 = \$100$$

$$\$157.35 \div (1.5735) = \$100$$

The relationships we have identified can be generalized if we have $100 represent the present value (PV) and $157.35 represent the future value (FV). The exponent used in the interest rate term can also be generalized if we let "n" equal the number of years into the future and insert "i" for the actual rate of interest being earned. The general format then becomes:

$$\mathbf{PV = FV \div (1+i)^n}$$

The present value amount generally will be comprised of several future payments. For example, how much would a person pay to receive a series of payments at the end of each year for three years? This relationship may be express as follows:

$$\mathbf{PV = [FV_1 \div (1+i)] + [FV_2 \div (1+i)^2] + [FV_3 \div (1+i)^3]}$$

If the constant annual payment was $100 and the interest rate was 12%, the expression for the present value of this future income flow could be presented as follows:

$$PV = [\$100 \div (1.12)] + [\$100 \div (1.12)^2] + [\$100 \div (1.12)^3]$$

$$PV = [\$100 \div (1.12)] + [\$100 \div (1.254)] + [\$100 \div (1.405)]$$

$$PV = \$89.29 + \$79.75 + \$71.17$$

$$PV = \$240.21$$

Although the person is going to be receiving three equal payments of $100 at the end of each of three years, they would not be willing to pay the total amount received--$300--at the present time.

While the present value formula may look difficult to understand, it is easily calculated through the use of standard spreadsheet computer programs, such as Excel, Lotus 1,2,3, and Quatro Pro. Nevertheless, it is extremely important for anyone involved with the evaluation of financial issues to understand the concept of discounting and present value. The key to understanding discounted values is to be familiar with the basic interest relationship:

$$\mathbf{1/(1+i)^n}$$

When calculating present values for financial instruments, such as bonds, there are three basic features, which underlay the calculations.

1. The present value is always less than the nominal value that occurs in the future.

2. The longer the delay in realizing some nominal value, the less is its present value.
3. The higher the interest rate used for discounting, the lower the present value.

The first two points merely restate the point that waiting has a cost; and the longer the wait, the larger the cost. The third point says that if money and other assets are more productive, as reflected in a higher interest rate, it is more costly to wait for benefits. The third point also raises the question of what interest rate to use in estimating present value calculations. Under certain assumptions it can be shown that the discount rate should reflect the cost of capital to the investor, that is, the cost of acquiring funds, whether for a private individual or for a company.

**Rates of Return and Their Measurement.** It is common for investors to consider the interest they receive on a fixed deposit or a bond as their return on an investment. If the investment is represented by a equity or stock, the return on investment will be received in the form of a dividend. Dividend payments represent the distribution of earning from the company among each of the stockholders. This return on investment (ROI) is calculated by dividing the dividend by the original investment.

$$\textbf{ROI = Dividend} \div \textbf{Investment}$$

In some instances an investment includes a component represented by a combination of borrowed funds and equity. In these cases it is common to measure the return received against the equity, or return on equity (ROE). This is calculated as follows:

$$\textbf{ROE = Dividend} \div \textbf{Equity}$$

Investments are generally expressed in terms of their original cost and the return they will generate, e.g. revenue. Since the cost is a current expenditure, it will be stated as the present value:

$$\textbf{PV=COST}$$

The future revenue (FR) is then expressed as the revenue that will be generated by the investment:

$$\textbf{FR}=R_1+R_2+\ldots+R_n$$

$$\textbf{FR}=\sum R$$

Using the expression developed above, it is possible to calculate the discounted value of future returns.

$$\textbf{DISCOUNTED FR}=[R_1 \div (1+i)]+[R_2 \div (1+i)^2]+\ldots+[R_n \div (1+i)^n]$$

Once all revenues and costs have been expressed in terms of present values, they can be added to find the net present value (NPV) for the project under consideration. NPV is the difference between the present value of the cost of the investment and the present value of the revenue generated by the investment. Although many investments will be made during a single period, there are circumstances where the investment will be staged over several years, thus in these circumstances even the original investment must be discounted for time; however, that exercise will be saved for a later discussion.

A positive value for the Net Present Value calculations indicates that the investment under consideration produces a net profit for the company, while a negative value would have suggested the proposed investment would cost the company more than the revenues it would produce.

An alternative method of evaluating, or ranking, potential investments is through the use of an internal rate of return calculation (IRR). Rather than declaring an interest rate, or cost of capital, at the outset, the IRR is calculated in place of the interest rate. The IRR is a rate of interest, or capital cost, which will establish an equality between the cost of the investment and the discounted value of all future revenue.

$$PV=[R_1 \div (1+IRR)]+[R_2 \div (1+IRR)^2]+...+[R_n \div (1+IRR)^n]$$

Because of the complicated calculations required to estimate the IRR, computers are generally used to arrive at final values. As in the case of present value calculations, standard spreadsheet computer programs, such as Excel, Lotus 1,2,3, and Quatro Pro are set up to assist with this type of operation. There are no pre-determined values, which represent acceptable levels for IRR calculations; however, the company's cost of funds would be one threshold indicator. In most IRR analysis the investor is looking for a value that exceeds 20%.